Middle Lower Miocene Fan 1 (LM2 F1) Play

Siphonina davisi biozone

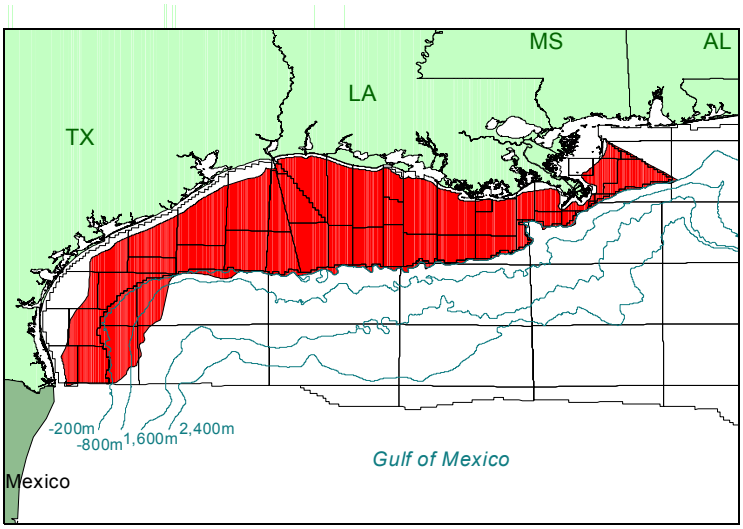

Figure 1. Play location.

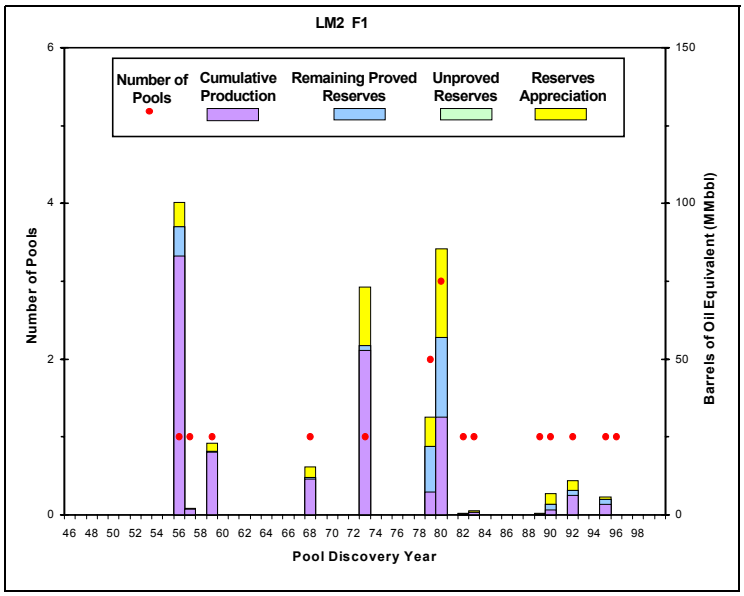

Figure 2. Exploration history graph showing reserves addition and number of pool discoveries by year.

LM2 F1 Play 17 Pools 54 Sands	Minimum	Mean	Maximum
Water depth (feet)	29	55	103
Subsea depth (feet)	9536	12151	15079
Number of sands per pool	1	3	9
Porosity	19%	26%	31%
Water saturation	20%	29%	39%

Table 1. Pool attributes. Values are volume-weighted averages of individual reservoir attributes.

Play Description

The established Middle Lower Miocene Fan 1 (LM2 F1) play occurs within the *Siphonina davisi* biozone. The play is also defined by deep-sea fan sediments in an extensional structural regime of salt-withdrawal basins and extensive listric faulting located on the modern Gulf of Mexico Region shelf. The LM2 F1 play extends from the South Padre Island and Port Isabel Areas offshore Texas to the Viosca Knoll and Main Pass Areas east of the present-day Mississippi River Delta (figure 1).

Updip, the play continues onshore into Texas and Louisiana, except in the High Island, Mustang Island, and North Padre Island Areas. In these areas, the play is limited by the shelf/slope break associated with the *Siphonina davisi* biozone and grades into the sediments of the Middle Lower Miocene Progradational (LM2 P1) play. To the southwest, the LM2 F1 play extends into Mexican national waters, while to the northeast, the play onlaps the Cretaceous carbonate slope. Downdip the play is limited by the Middle Lower Miocene Fan 2 (LM2 F2) play.

Play Characteristics

The LM2 F1 play is characterized by deepwater turbidites deposited basinward of the LM2 shelf margin on the LM2 upper and lower slopes, in topographically low areas between structural highs, and on the abyssal plain. Component depositional facies include channel/levee complexes, sheet-sand lobes, interlobes, fringes, and slumps. These deep-sea fan systems are often overlain by thick shale intervals representative of sand bypass on the shelf, or sand-poor areas on the slope.

Most of fields in the LM2 F1 play are structurally associated with normal faults. Other less common trapping structures include growth

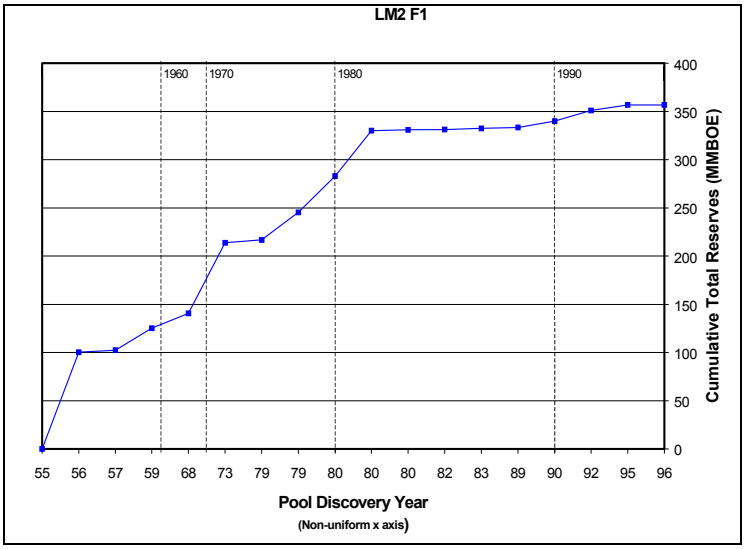

Figure 3. Plot of pools showing cumulative reserves by discovery order. Note the non-uniform x axis.

LM2 F1 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	17	0.014	1.484	0.278
Cumulative production	--	0.012	1.177	0.221
Remaining proved	--	0.003	0.306	0.057
Unproved	0	0.000	0.000	0.000
Appreciation (P & U)	--	0.003	0.423	0.079
Undiscovered Conventionally Recoverable Resources				
95th percentile	--	0.016	1.122	0.225
Mean	30	0.041	1.497	0.308
5th percentile	--	0.086	1.884	0.400
Total Endowment				
95th percentile	--	0.034	3.028	0.582
Mean	47	0.059	3.403	0.665
5th percentile	--	0.104	3.790	0.757

Table 2. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

faults with rollover anticlines and shale diapir-like bodies with traps on the flanks of the shale or in sediment drape over the shale. Seals are provided by the juxtaposition of reservoir sands with shales, either structurally (e.g., faulting) or stratigraphically (e.g., lateral shale-outs, overlying shales).

Discoveries

The LM2 F1 gas play contains total reserves of 0.018 Bbo and 1.906 Tcfg (0.357 BBOE), of which 0.012 Bbo and 1.177 Tcfg (0.221 BBOE) have been produced. The play contains 54 producible sands in 17 pools, all of which contain proved reserves (table 1; refer to the Methodology section for a discussion of reservoirs, sands, and pools). The first reserves, the largest pool in the play, and maximum yearly total reserves were discovered in 1956 in the West Cameron 71 field (100 MMBOE) (figures 2 and 3). Ninety-five percent of the play's cumulative production and 93 percent of the play's total reserves have come from pools discovered before 1990. The most recent discovery, prior to this study's cutoff date of January 1, 1999, was in 1996.

The 17 discovered pools contain 123 reservoirs, of which 122 are nonassociated gas and 1 is saturated oil. Cumulative production has consisted of 95 percent gas and 5 percent oil.

Assessment Results

The marginal probability of hydrocarbons for the LM2 F1 play is 1.00. The play contains a mean total endowment of 0.059 Bbo and 3.403 Tcfg (0.665 BBOE) (table 2). Thirty-three percent of this BOE mean total endowment has been produced.

Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of 0.016 to 0.086 Bbo and 1.122 to 1.884 Tcfg at the 95th and 5th percentiles, respectively (figure 4). Mean UCRR are estimated at

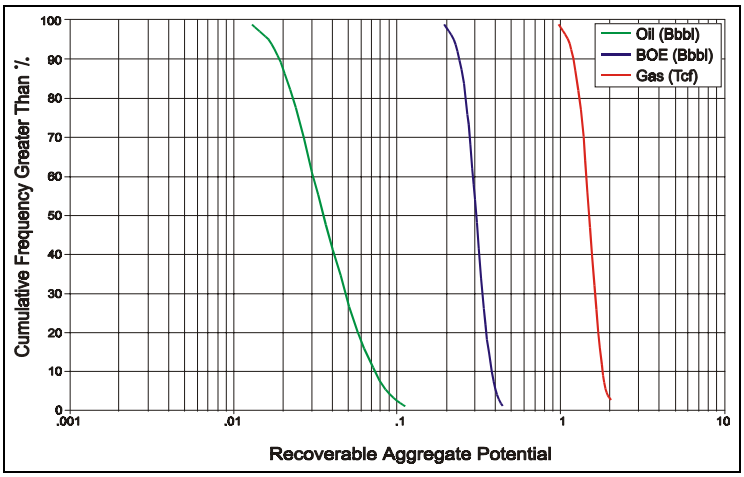

Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

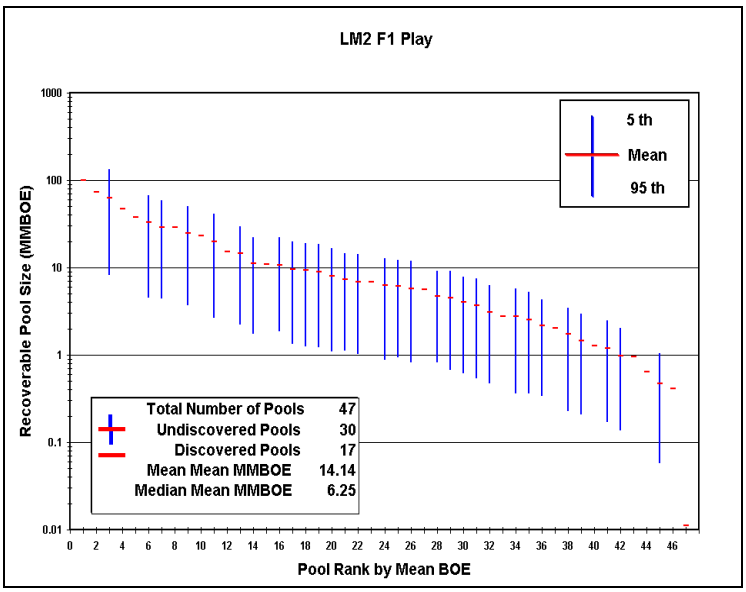

Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

0.041 Bbo and 1.497 Tcfg (0.308 BBOE). These undiscovered resources might occur in as many as 30 pools. The largest undiscovered pool, with a mean size of 63 MMBOE, is forecast as the third largest pool in the play (figure 5). The forecast places the next four largest undiscovered pools in positions 6, 7, 9, and 11 on the pool rank plot. For all the undiscovered pools in the LM2 F1 play, the mean mean size is 10 MMBOE compared with the 21 MMBOE mean size of discovered pools. The mean mean size for all pools, including both discovered and undiscovered, is 14 MMBOE.

BOE mean UCRR contribute 46 percent to the play's BOE mean total endowment. Future discoveries are expected to be made in structural and stratigraphic traps around salt and shale bodies, as well as in salt-withdrawal anticlines (turtle structures).